

CLAIMS

1. A recording medium having playlist information recorded thereon, wherein
 - 5 the playlist information defines a playback section of each of a plurality of digital streams, and includes main-path information and sub-path information,
 the main-path information designates one of the digital streams as a main stream, and defines a portion of the main stream as a primary playback section,
10 the sub-path information designates another one of the digital streams as a substream, and defines a portion of the substream as a secondary playback section that is to be synchronously played back with the primary playback section,
15 the recording medium further has recorded thereon the one of the plurality of digital streams designated as the substream, together with an entry map, and
 the entry map indicates a plurality of entry points
20 on the substream in one-to-one correspondence with a plurality of entry times on a timeline of the substream.
2. The recording medium according to Claim 1, wherein
 the main-path information and the sub-path information
25 includes, for each playback section, timing information indicating a playback start time and a playback end time of the playback section on a timeline of a respective digital stream,

the sub-path information further includes synchronous information, and

a synchronization point for the synchronous playback is indicated on the timeline of the primary playback section
5 by timing information included in the synchronous information.

3. The recording medium according to Claim 2, wherein
the entry map is of a first type or a second type,

10 the first type entry map indicates the plurality of entry times at a constant time interval on the timeline of the substream or the plurality of entry points at a constant data interval on the substream,

15 the second type entry map indicates the entry points each located at a head of a complete data set, and

the entry map includes a flag indicating whether the entry map is of the first type or the second type.

4. The recording medium according to Claim 1, wherein

20 the main stream carries primary video, and
the substream carries secondary video.

5. The recording medium according to Claim 4, wherein

25 the playlist information instructs a playback device to present playback of the primary video and playback of the secondary video on a same screen.

6. The recording medium according to Claim 5, wherein

the sub-path information includes synchronous information,

a synchronization point for the synchronous playback is indicated by timing information included in the 5 synchronous information, and

if the timing information is set to an undefined value, the synchronization point is set by the playback device to a time at which a predetermined user operation is received.

10 7. The recording medium according to Claim 5, wherein the synchronous information further includes position information and size information,

the position information indicates a display position of the secondary video playback when presented on the same 15 screen as the primary video playback, and

the size information indicates a height and a width of the secondary video playback when presented on the same screen as the primary video playback.

20 8. A playback device for executing trick play of a main stream and a substream, a portion of the main stream being defined as a primary playback section, a portion of the substream being defined as a secondary playback section, and a start point of the trick play being defined on a timeline 25 of the primary playback section, the playback device comprising:

a first conversion unit operable to convert the start point into a corresponding address on the main stream;

a second conversion unit operable to convert the start point into a corresponding point defined on a timeline of the secondary playback section, and to further convert the corresponding point into a corresponding address on the
5 substream;

 a reading unit operable to read the main stream and substream starting from the respective addresses obtained by the first and second conversion units; and

10 a playback unit operable to play back the main stream and the substream read by the reading unit, wherein the primary and secondary playback sections are defined by playlist information,

 the playlist information includes synchronous information,

15 the synchronous information includes timing information indicating, on the timeline of the primary playback section, a synchronization point for starting synchronous playback of the secondary playback section with the primary playback section,

20 the substream is associated with an entry map, the second conversion unit is operable to use the synchronous information to perform the conversion into the corresponding point on the timeline of the secondary playback section, and

25 the second conversion unit is operable to use the entry map associated with the substream to perform the conversion into the corresponding address on the substream.

9. The playback device according to Claim 8, wherein

the entry map includes a flag,

the flag is information indicating whether the entry map is of a first type or a second type,

5 when the flag indicates the first type, the second conversion unit is operable to obtain the corresponding address by conducting a stream analysis starting from one of a plurality of entry times or of a plurality of entry points that is near a requested start point for trick play,

10 the plurality of entry times being at a constant time interval on the timeline of the substream, and the plurality of entry points being at a constant data interval on the substream,

and

when the flag indicates the second type, the second conversion unit is operable to obtain, as the corresponding address, an entry point that corresponds to an entry time near the requested start point, from among entry points each located at a head of a complete data set.

20 10. The playback device according to Claim 8, wherein

the main stream is a digital stream carrying primary video, and

the substream is a digital stream carrying secondary video,

25 the playback device further comprises:

a first decoder operable to decode the main stream to obtain the primary video; and

a second decoder operable to decode the substream to

obtain the secondary video.

11. The playback device according to Claim 10, further comprising:

5 a composite unit operable to present, on a same screen, playback of the primary video obtained by the first decoder and the secondary video obtained by the second decoder, by overlaying the primary video with the secondary video.

10 12. The playback device according to Claim 11, wherein the synchronous information includes timing information set to an undefined value to indicate the synchronization point,

15 the undefined value instructs the playback device to set, as the synchronization point, a time at which a predetermined user operation is received during playback of the primary playback section, and

the playback device further comprises:

20 a setting unit operable, if the timing information included in the synchronous information is set to the undefined value, to receive a rock operation specifying the synchronization point under a state where the primary playback section is solely played back, and the setting unit is further operable to overwrite the undefined value
25 with a value indicating the point specified by the rock operation.

13. The playback device according to Claim 12, wherein

the rock operation is made by a user by selecting one of button images presented on the main stream playback, and

the composite unit is operable to overlay playback of the substream on the selected button image presented on the main stream playback.

14. The playback device according to Claim 11, wherein the synchronous information further includes position 10 information,

the position information indicates a display position of the secondary video playback when presented on the same screen as the primary video playback, and

the composite unit is operable to present the secondary 15 video in accordance with the position information.

15. The playback device according to Claim 14, further comprising:

a scaler operable to reduce or enlarge an image size 20 of playback of the secondary video obtained by the second decoder, wherein

the synchronous information further includes size information,

the size information indicates a height and a width 25 of the secondary video playback when presented on the same screen with the primary video playback, and

the scaler is operable to perform the image size reduction or enlargement according to the size information.

16. A program for causing a computer to execute trick play of a main stream and a substream, a portion of the main stream being defined as a primary playback section, a portion 5 of the substream being defined as a secondary playback section, and a start point of the trick play being defined on a timeline of the primary playback section, the program comprising code operable to cause the computer to perform:

10 a first conversion step of converting the start point into a corresponding address on the main stream;

15 a second conversion step of converting the start point into a corresponding point defined on a timeline of the secondary playback section, and further converting the corresponding point into a corresponding address on the substream;

20 a reading step of reading the main stream and substream starting from the respective addresses obtained in the first and second conversion steps; and

25 a playback step of playing back the main stream and the substream read in the reading step, wherein the primary and secondary playback sections are defined by playlist information,

the playlist information includes synchronous information,

25 the synchronous information includes timing information indicating, on the timeline of the primary playback section, a synchronization point for starting synchronous playback of the secondary playback section with

the primary playback section,
the substream is associated with an entry map,
in the second conversion step, the synchronous
information is used to perform the conversion into the
5 corresponding point on the timeline of the secondary
playback section, and

in the second conversion step, the entry map associated
with the substream is used to perform the conversion into
the corresponding address on the substream.

10

17. A playback method for executing trick play of a main
stream and a substream, a portion of the main stream being
defined as a primary playback section, a portion of the
substream being defined as a secondary playback section,
15 and a start point of the trick play being defined on a timeline
of the primary playback section, the playback method
comprising:

a first conversion step of converting the start point
into a corresponding address on the main stream;

20 a second conversion step of converting the start point
into a corresponding point defined on a timeline of the
secondary playback section, and further converting the
corresponding point into a corresponding address on the
substream;

25 a reading step of reading the main stream and substream
starting from the respective addresses obtained in the first
and second conversion steps; and

a playback step of playing back the main stream and

the substream read in the reading step, wherein
the primary and secondary playback sections are defined
by playlist information,

5 the playlist information includes synchronous
information,

the synchronous information includes timing
information indicating, on the timeline of the primary
playback section, a synchronization point for starting
synchronous playback of the secondary playback section with
10 the primary playback section,

the substream is associated with an entry map,

in the second conversion step, the synchronous
information is used to perform the conversion into the
corresponding point on the timeline of the secondary
15 playback section, and

in the second conversion step, the entry map associated
with the substream is used to perform the conversion into
the corresponding address on the substream.